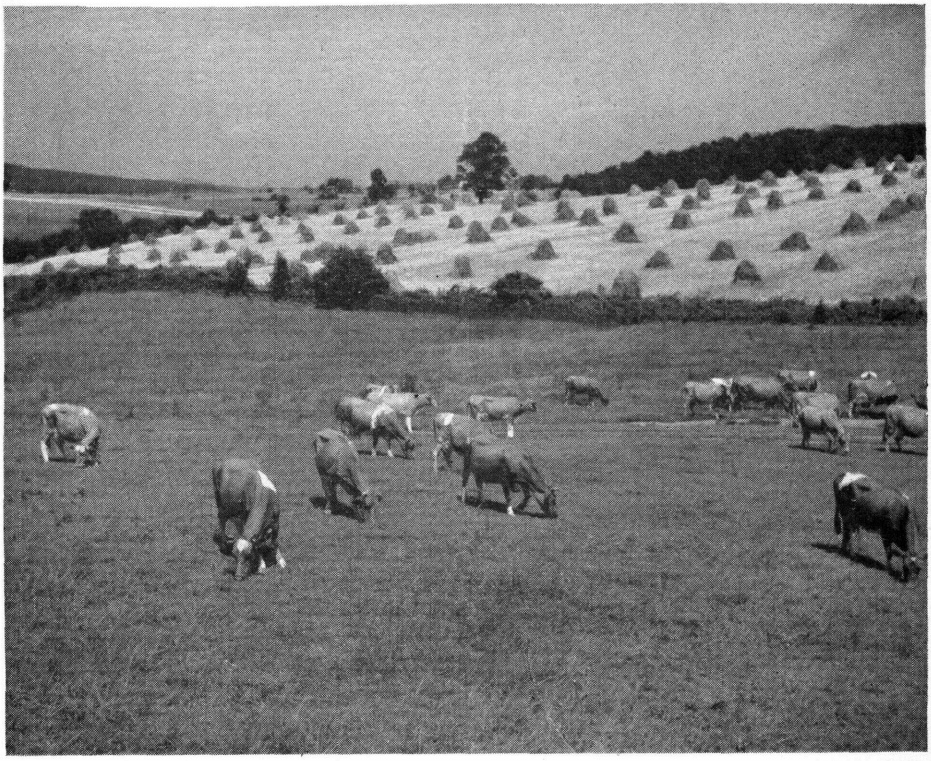
GOOD PASTURES



PRODUCE

- MEAT
- FATS
- MILK
- EGGS
- WOOL
- LEATHER

SAVE

- MANPOWER
- MACHINERY
- TRACTOR FUEL
- SOIL

FARMERS' BULLETIN
No. 1942

U.S. DEPARTMENT OF AGRICULTURE

Good Pastures Produce Meat, Fats, Milk, Eggs, Wool, Leather and Save Manpower, Machinery, Tractor Fuel, and Soil

AMERICAN FARMERS must increase the production of corn, peanuts, and other fattening and oil-producing crops, and they must grow more grass to produce more fats in the form of milk and meat. Fats and oils are among the most vital materials of war. They keep the armies fit, they fire the guns, they keep the planes up and the ships afloat.

With the Japanese occupation of the East Indies, over a billion pounds of coconut oil and other fats and oils which we had been importing annually for food and for the manufacture of paint, varnishes, explosives, and lubricating oils were suddenly cut off. The farms of the United States must make good this shortage to insure our victory in the war and in the peace that follows.

The word "grass" as used here, includes the true grasses and the legumes used in pasture. Ordinarily, grass supplies about 48 percent of the total annual feed requirement of our livestock as grazing, and about 12 percent as hay, while the remaining 40 percent is supplied by corn and other harvested feed. Young grass is the most perfect feed for most livestock. It is palatable, highly digestible, and rich in proteins, minerals, and vitamins.

With the shortages of labor, gasoline, equipment, and transportation for shipping fertilizers, farmers are depending more and more upon grass—more pastures and better pastures—as a means of producing the necessary fats in milk and meat. In so doing, they not only increase their income; they insure continued production by increasing the productivity of their lands.

This bulletin describes briefly the most effective methods of increasing the production of meat, milk, and other wartime crops by the skillful use of grass.

Washington, D. C. Issued May 1943

GOOD PASTURES

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Contents

INTRODUCTION

FARMERS in the United States have a great opportunity to make a vital contribution to winning the war and preparing for the peace that will follow by increasing their output of meat, milk, and eggs. This can be done most effectively by the use of more and better pastures.

The average land in pasture produces somewhat less feed per acre than the same land in cultivated crops; but much less labor, power, equipment, seed, and fertilizer is required to operate land in grass than in cultivated crops. In the Corn Belt, for example, a typical acre of corn requires about 20 hours of man labor, 45 hours of horse labor, and corresponding hours of equipment use during the year. Land in good pasture, on the other hand, requires about 3 hours of man labor and 3 hours of horse labor per acre, principally for maintaining fences and mowing weeds. The labor of caring for livestock fed on harvested feed is obviously greater than the labor required for livestock kept on pasture alone or on pasture with some supplementary feed. In fact, pasture costs are only 10 to 20 percent of the total annual cost of feeding.

A large percentage of the farms in the Southeast and other parts of the country do not have any improved pasture. Many more do not have enough pasture to supply the livestock they have with plenty of good grass throughout the grazing season. To this extent they are unprepared to make their greatest contribution to winning the war. Farmers who produce enough meat, milk, and other food for their families save the costs of shipping, processing, and other costs of distribution. They are more certain of an adequate supply of food. Furthermore, they release the commercial supplies of food and transportation facilities for other needs.

Beef and lamb of satisfactory quality to meet the demands of the bulk of meat-eating people can be produced from grass alone (fig. 1). Where a higher finish or more fat is desirable, grain may be used.

Milk production can be substantially increased, with greater economy in the use of grain, if better pastures are provided throughout the grazing season. When dairy cows have been provided with plenty of good pasturage, available grain should go to the cows that will make the best use of it as a supplement to pasture. Good pastures may save on an average 15 percent of the grain ration for hogs and 5 to 10 percent of the ration of poultry. The greater production of pasture forage, including both the true grasses and the legumes used in pasture, will make our grain supplies go farther.

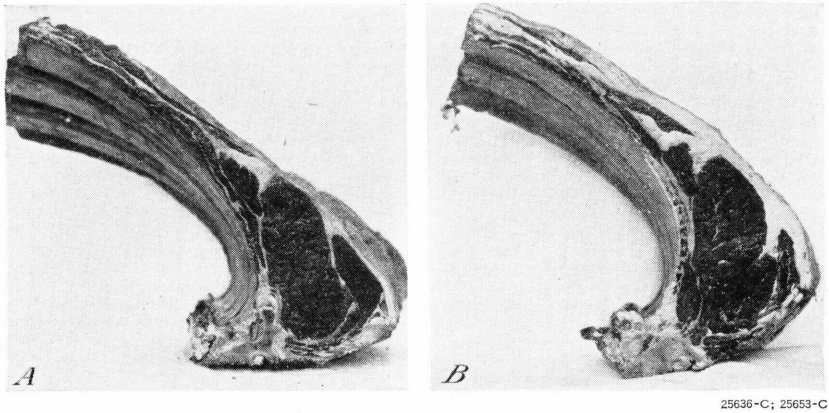

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FIGURE 1.—No significant differences in palatability were found in rib roasts from representative steers fed on grass alone (*A*), and on grain and grass (*B*), according to cooperative tests made by the West Virginia Agricultural Experiment Station and the United States Department of Agriculture.

Finally, grass while growing adds humus to the soil, improves its structure, causes it to absorb water, and protects it from erosion. Grasses in a rotation with cultivated crops aid in increasing yields of the cultivated crops.

Naturally, with the desire all over the Nation to serve and save, those whose business it is to bring this about want to know how to use idle land and how to improve pastures. This bulletin gives the results obtained by a few of the many who have undertaken pasture improvement and tells how (fig. 2) they went about it.

EXAMPLES OF PASTURE IMPROVEMENT

Glen Conant, Lewis County, W. Va., has a dairy farm with 27 cows, 21 sheep, and 2 horses. Before he undertook a complete soil conservation program for his farm, it was badly affected by sheet erosion, and the pasture consisted of broomsedge and poverty grass (poverty oatgrass). The carrying capacity was low, and he was able to maintain only 8 cows, 12 sheep, and 2 horses. Mr. Conant has treated his pasture with lime and fertilizer and has practiced mowing and controlled grazing. Recently he stated:

> One of my pasture fields was so poor that I could only graze 2 horses on it. The same field now, since I have treated it, is carrying 8 cows and 2 horses. A good sod has been established, which has checked the sheet erosion; other

pastures have been improved; and the number of animals on the farm has been increased from 22 to 50. Investments made in lime and fertilizer pay me greater dividends than any other way I can spend my money on the farm. I keep an accurate record of all my farming operations and know definitely that treating pasture land is a paying proposition. That's why I am planning on giving them the second treatment.

A field of rather steep irrigated land was seeded to alfalfa and a mixture of grasses including crested wheatgrass, smooth bromegrass, and tall oatgrass on the farm of Leroy Olson at Virginia, Idaho, in the spring of 1941. An excellent stand was obtained, and the farmer harvested some hay from this field the first season. In 1942 he harvested one full crop of hay, after which he put an electric fence around the field and used it for pasture for his dairy cows. He says:

That is certainly a fine mixture. It produces large yields of excellent-quality hay, and the cows seem to like it better than straight alfalfa. It also makes very good pasture, and I am surprised the number of cows it will support per acre. I have had no trouble with bloat, and my cows increased their milk production after I put them on this pasture. This makes a good combination for us small irrigation farmers, as we can adjust our hay and pasture requirements very easily under this system. This field used to wash pretty bad, but I have noticed no washing whatsoever since it has been in alfalfa and grass.

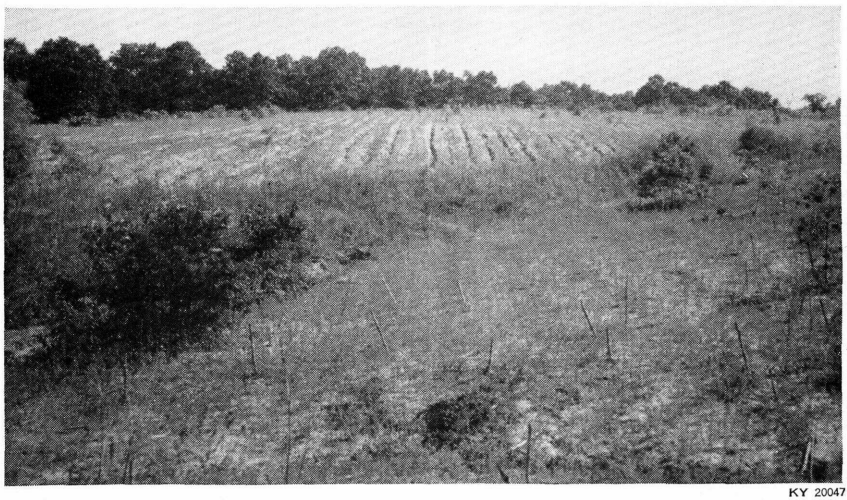

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FIGURE 2.—Worn-out and abandoned cropland in western Kentucky. Such land can be converted to good pasture. (See figs. 3 and 4.)

Mr. Olson also has 80 acres of abandoned dry-farm land on the Downey flat, which he obtained from the county. This land has very shallow, poor, gravelly soil and was not even supporting a good stand of weeds and cheat grass. Ten acres of this land was seeded to a dry-land pasture mixture in the fall of 1941. Good results were obtained, and Mr. Olson plans to seed the rest of the land just as fast as possible.

Lee Ezell operates a 55-acre dairy farm in the Bogue-Chitto-Pearl River Soil Conservation District, in Louisiana, near Franklinton. In 1941 he spent $18.20 an acre developing 10 acres of clover-Dallis grass pasture on some cropland that had lost most of its topsoil. On March

16, 1942, he turned 20 cows and 15 yearlings onto this pasture. As a result, milk production was increased by 150 pounds per day and the cost of barn feeding was reduced $5.10 a day. In the first 50 days of grazing he had saved $255 in feed, and the additional milk at $2 per hundred pounds returned $150, making a return of $40.50 per acre from the pasture. On May 4 the cows were moved to other pasture until the clover reseeded. Then they were turned back to graze on Dallis grass.

Part of an abandoned, badly eroded and brush-covered field on a farm near Princeton, Ky., that had been tax-delinquent for several years was limed, treated with superphosphate, and seeded to grasses and legumes by the Western Kentucky Experiment Substation 15 years ago. As a result, it has carried an average of 1 steer to 1½ acres of pasture and has produced an annual average of 160 pounds of beef per acre at a cost of 3.2 cents a pound (fig. 3). A similar treatment with rock

C-8546

FIGURE 3.—Clearing brush, seeding, liming, and applying superphosphate resulted in a solid stand of grass and clover. For 14 years steers averaged 160 pounds of gain per acre annually. (Courtesy of the Kentucky Agricultural Experiment Station.)

phosphate on this formerly abandoned land also enabled it to carry 1 steer to 1½ acres and produce 164 pounds of gain per acre at a cost of 3.1 cents per pound. The same kind of soil in the same field, without any treatment other than seeding and keeping the brush down, carried only 1 steer to 4 acres and produced an annual gain of 46 pounds per acre at a cost of 10½ cents per pound (fig. 4). In short, the treated pasture land produced 3½ times as much beef per acre as the untreated land. The total cost of the original treatment was paid for by the increased gains of the steers during their first 90 days on pasture in the first year of the experiment.

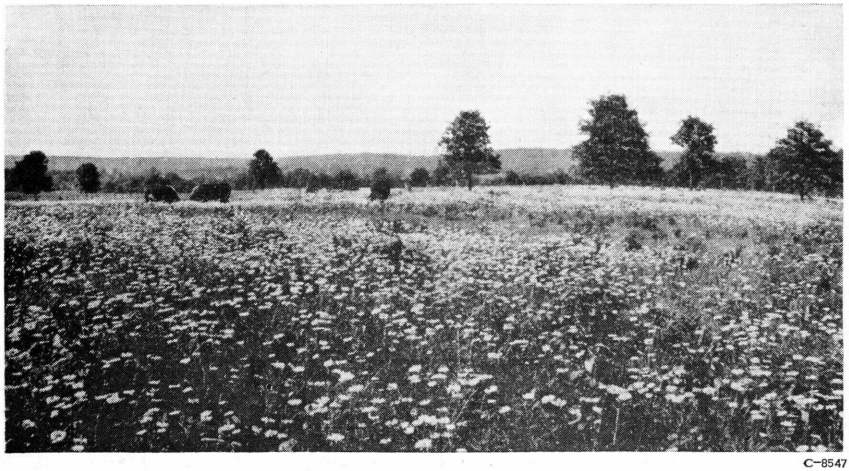

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FIGURE 4.—Clearing brush and seeding grass on such land is not enough. There is too little grass—and too many weeds—for satisfactory beef production. The average for the last 14 years was 46 pounds of gain per acre on steers. (Courtesy of the Kentucky Agricultural Experiment Station.)

WAYS OF INCREASING FOOD PRODUCTION BY MEANS OF PASTURES

Several kinds of land that are now idle or being used for other purposes could make a greater contribution to victory and peace if converted to grass. To increase the area of food-producing pastures, the five following general lines of action should be taken.

1. Improve the use of the pastures we now have. Many of them are on land which was continued in cultivation for several years after most of the fertile surface soil had washed away and profitable crop production had ceased. The soil is sour, with too many weeds and brush, too little grass, and almost no legumes. The land may be too hummocky to mow. The cattle do not get enough to eat, and what they get is of poor quality (fig. 5). The productivity of such pastures can be doubled or trebled by renovation, including the use of lime, barnyard manure, superphosphate, and legumes.

2. Make greater use for pasture of meadows and hay lands in the regular rotations (fig. 6). When meadows in the crop rotation are used for grazing, good methods of use are as important as they are on land that is used permanently as pasture. For example, alfalfa requires about 6 weeks without close grazing or mowing just before killing frosts to build up root reserves, thereby resisting winter-killing and increasing production the next spring. The establishment on good cropland of pastures to be plowed up in a few years (3 to 6) will mean bigger crops, fewer weeds, and soil that is easier to work.

3. Plow up fertile pastures that are suitable for cultivation and include them as part of the cropland in the rotation (fig. 7). Many farms have such land that has been in grass for many years. Such pasture land will produce big crops now and make it possible to put overworked cropland into grass. Of course there are problems, such as making lanes and providing water and shade, in using other fields

WIS-991

FIGURE 5.—Poor pasture, poor stock, low production.

MO-1576

FIGURE 6.—Good land in grass for grazing as a part of the crop rotation in northwestern Missouri. A pasture mixture was seeded with rye in the fall. It was furnishing good grazing in April.

for pasture. Grazing meadows that are rotated with cultivated crops is a good means of reducing the damage by certain livestock parasites.

4. Stop plowing steep and erodible land which is not suitable for cultivation (fig. 2). Such land as is better adapted to growing grass than to growing trees can be made more productive and profitable as pasture than it has been as cropland. We have a lot of such land that is kept bare most of the year upon which we waste labor. The soil that is washed off covers roads and fills up streams and reservoirs. The excessive runoff water causes floods that wash out bridges,

drive people from their homes, and drown crops. People and livestock are left without sufficient water to drink. Factories run short of water to do their work. Putting grass or trees on such land will save labor, reduce flood damages, and get more water into the underground supply where it is needed for wells and springs.

KAN—5224

FIGURE 7.—Land suitable for cultivation which has been in pasture for several years (3 to 6 or more) should be plowed up for corn or other crops needed for the war and other cropland seeded to grass for grazing as a part of the crop rotation.

5. Convert to pasture abandoned cropland and other wasteland that lies bare or has grown up to sumac, briers, sassafras, persimmon, broomsedge, and other brush or weeds (fig. 8). Much of this land is so poor and impervious to rain that it must be built up by liming, fertilizing, and the use of legumes such as sweetclover, lespedeza, and kudzu before it is fit to produce desirable grasses (fig. 9). Some of the abandoned and wasteland may need to be drained before it can be prepared for pasture.

Avoid wasting labor, seed, and fertilizer on land that is not fit for pasture because it is too steep, too rocky, too sandy, or too poorly drained. Such land is better adapted to growing trees, use as wildlife cover, or conversion to fishponds.

6. Make greater use of irrigated pastures and better use of irrigation water on pastures. Good irrigated pastures will graze two to three cows per acre throughout the growing season and often make better net returns than the common field crops.

At the Caldwell Experiment Station, in southwestern Idaho, the carrying capacity of irrigated pastures for dairy cattle was increased 15 percent by increasing the number of irrigations during the season from 5 to 7. By applying 12.5 loads of manure per acre, in addition

to the more frequent irrigations, the carrying capacity was increased 58.7 percent above that of the less frequently irrigated areas without manure.

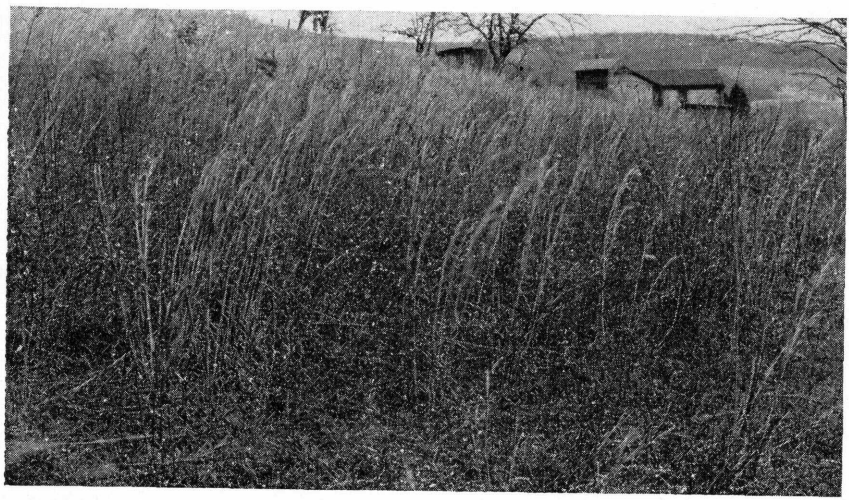

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FIGURE 8.—In the less fertile sections of the eastern part of the United States, there are millions of acres of such abandoned cropland grown up to broomsedge and weeds. Most of it will make productive and profitable pastures. (Courtesy of Extension Service.)

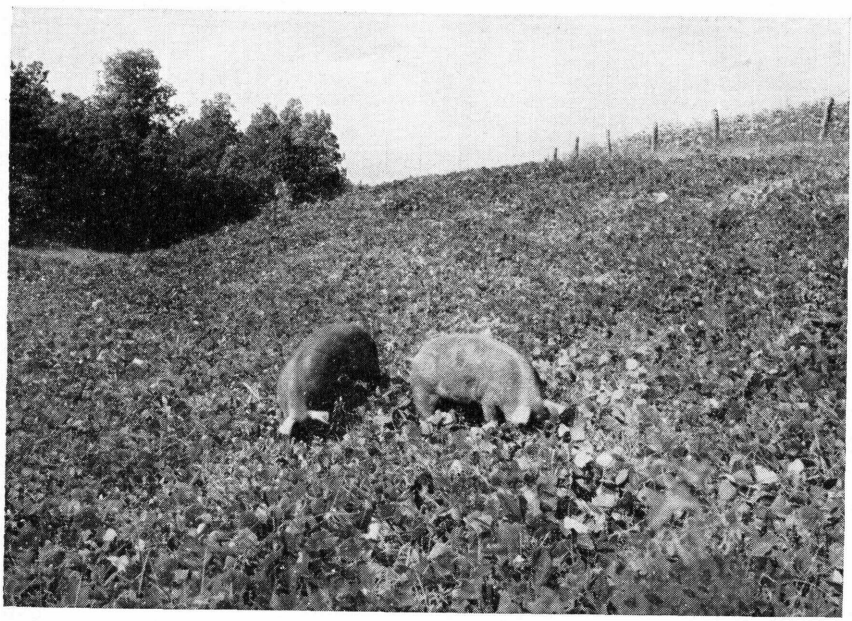

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FIGURE 9.—Farmers in the Southeastern States find kudzu furnishes excellent grazing for hogs as well as cattle. Prior to being planted to kudzu, this steep field suffered heavy soil losses through erosion and was producing very low yields of crops.

The comparative acre returns above feed costs for the two different frequencies of irrigation and with and without applications of manure were as follows: Light irrigation $60.90; light irrigation and manure, $87.04; adequate irrigation, $80.14; adequate irrigation and manure, $108.03.

THE PROGRAM FOR IMPROVING PASTURES

As a part of the 1943 production program, payments are available for a number of practices which are necessary for the improvement of old and the establishment of new pastures. For example, in the Southern Region the Agricultural Adjustment Agency offers payments of several dollars an acre, which vary somewhat by States, for the establishment of a good stand of sericea lespedeza or of kudzu. These legumes have remarkable value in helping to restore run-down land. The rates of payment vary with the costs of applying the practices in different parts of the country. They also vary from State to State because in some States more emphasis is placed on the value of certain practices than in others. The AAA assistance for establishing pastures at the specified rates is available for an unlimited number of acres in most States in the South. General information regarding these payments is given in the following sections, which discuss various improvement practices and steps in pasture establishment. For specific information, one should see the chairman of a county AAA committee or his local committeeman.

MAKE ALL LAND DO ITS BEST

Where soil conservation districts have been organized and technical staffs established, farmers may obtain individual help in determining the best uses to make of the various classes of land on their farm and applying the conservation practices necessary to protect their soil and make it more productive. Thousands of farmers throughout the United States have found that the production of their farms has increased greatly since they put a complete plan for soil conservation into effect. Such a plan consists first of using all land for the purposes for which it is best suited—crops, pasture, woods, or wildlife. It provides for the practices necessary to keep the soil from washing away, to make the best use of all available water, to get rid of excess water safely, and to raise the fertility of the soil so that bountiful crops and rich pastures can be grown.[1]

ESSENTIALS FOR MORE PRODUCTIVE PASTURE

PLANNING SEASON-LONG USE OF PASTURE

A well-planned schedule of the use of pasture is necessary for the greatest production from season-long grazing. The successful farm has more than one pasture field, and more than one kind of grass for the production of milk or meat throughout the growing season. Under most conditions, the permanent pasture alone cannot supply all the pasturage required for continued gains. In addition to the permanent

[1] For further information see Farmers' Bulletin 1909, More Food Through Conservation Farming.

pasture, small grains are widely adapted as supplemental pasture in the early spring, late fall, and winter. The deep-rooted legumes like alfalfa and sweetclover in the North and West, and preferably in mixture with grass, or kudzu in the South are suitable for supplementing the permanent pasture. Where it is not practical to maintain plenty of succulent pasture forage in July and August by means of permanent pastures or perennial or biennial legumes, annuals such as Sudan grass and millet are very valuable for midsummer grazing (fig. 10).

MO-871

FIGURE 10.—Sudan grass in northeastern Missouri in mid-July. Such pastures will carry two or three cattle per acre during July, August, and September, while the permanent pasture is dormant and recovering from spring grazing.

Stubblefields with seedings of alfalfa, red clover, sweetclover, or annual lespedeza and meadow aftermath will also increase the pasture forage in the summer and fall months (fig. 11). In the Pacific Northwest, where winters are mild, the volunteer growth and winter annual grasses in grain stubble provide considerable grazing during the fall, winter, and early spring.

In the South, winter-growing legumes and grasses provide considerable winter pasture, and much earlier spring grazing. The increase in beef and dairy products produced by controlled grazing of permanent pastures will pay good returns for the additional time and expense expended in developing a supplemental-pasture program.

In the spring, delay turning the livestock onto the grass until it has grown 3 or 4 inches. This may reqiure a little more barn feed or the use of the early-growing cereals as supplemental pasture. But the increase in feed cost and labor from such practice will be more than repaid by the later increase in production from the permanent pasture.

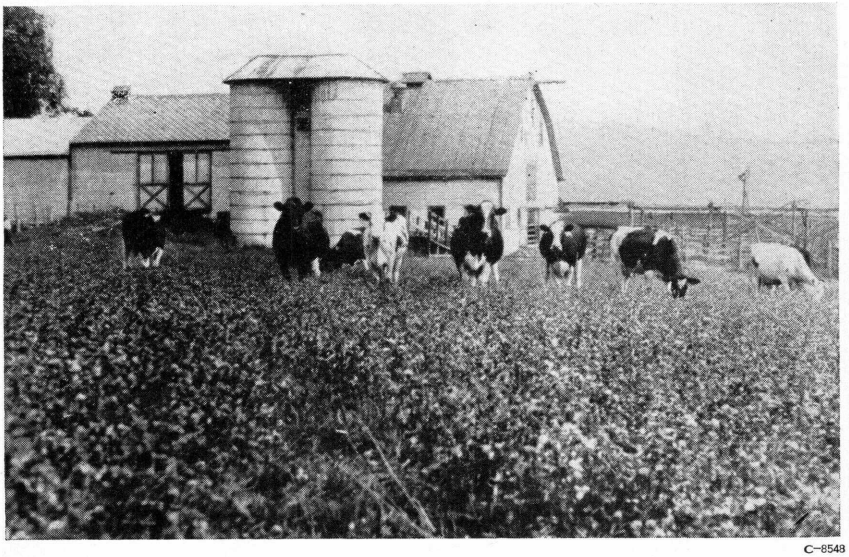

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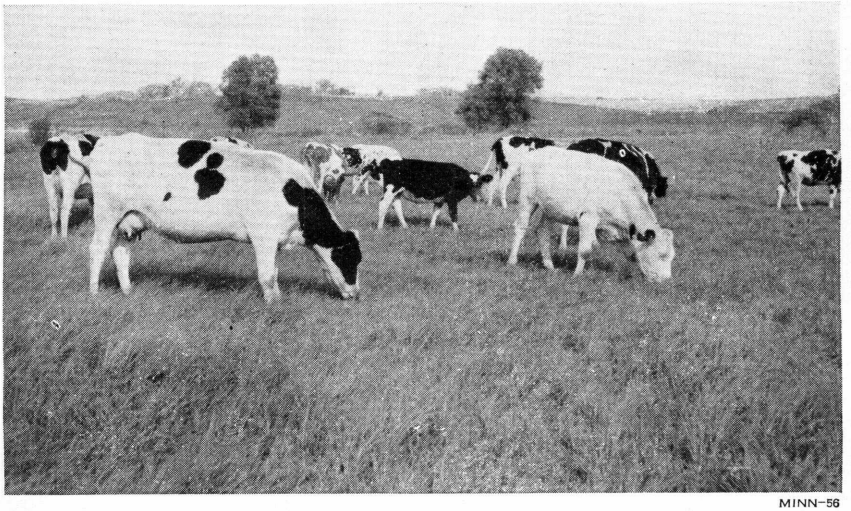
FIGURE 11.—Meadow aftermath, or rowen, provides midsummer grazing. Land should be used right up to the barn. Lots should be small enough to pave or large enough to make good pasture. (Courtesy of the Massachusetts Agricultural Extension Service.)

In midsummer, when the permanent grasses become dormant because of hot, dry weather, the stock should be moved to some supplemental pasture (fig. 12). If the animals, especially dairy cows, have insufficient feed for a week or two during a particularly dry period



MINN-56

FIGURE 12.—Reed canary grass makes a good, highly productive pasture on low, wet, and boggy land and affords succulent grazing when upland pastures are dried up. Photographed at the end of September in southeastern Minnesota.

and the milk production goes down, it is almost impossible to restore it completely. If supplemental pasture is not available, it is better to use some harvested feed rather than overgraze the permanent pasture and allow milk cows to fall off in production or fattening animals to lose weight. When a thicker stand of grass is needed, protection from grazing affords a greater opportunity for the most desirable kinds of grass and clover to produce seed.

In the fall, remove the animals while at least 3 inches of top growth remains. This allows the grasses and legumes to store up root reserves and thereby to stand the winter better. As a result, the plant growth, both tops and roots, will be more vigorous and productive the following spring.

In the Southern Region the Agricultural Adjustment Agency has made provision in certain States for a payment of $7.50 per acre in 1943 for establishing a system of season-long grazing by setting aside a fenced field or a part of a field to be seeded to annual crops for supplemental grazing.

MOWING OR CLIPPING WEEDS AND MATURE GRASS

Mowing or clipping pastures is closely associated with proper stocking. The purposes are to control weeds and obtain more uniform grazing. Weeds are usually worse on infertile and overgrazed pastures; they rob pasture plants of food, water, and sunlight (fig. 13). Clover and Bermuda grass may be killed out by the shading effect of weeds. In addition, weeds interfere with the grazing of the palatable plants. On a weedy pasture at the Mississippi Experiment Station,

S- 8797-C

FIGURE 13.—Such weedy pastures usually require renovation including mowing, disking, liming, fertilizing, and seeding with legumes to make them highly productive. (Courtesy of the Extension Service.)

part of which was mowed for 3 years, the cattle ate 80 percent of the forage. On a similar unmowed part, they consumed only 50 percent of the forage. Furthermore, the feed on the mowed part was more nutritious.

Under irrigation, rotation grazing should be practiced. The pasture land should be divided into at least two fields or preferably three of approximately equal grazing capacity and each should be grazed and irrigated in definite sequence during the season. Under average conditions three pastures work very well by providing grazing of each pasture for about 1 week and resting for about 2 weeks in each grazing cycle. Each pasture should be irrigated as soon as the stock are moved to the next pasture in rotation. This forces rapid growth and allows time for the ground to dry before the stock are turned on, 10 days to 2 weeks later. With a rotation pasture system, one pasture may be grazed as soon in the spring as the ground is dry enough so that the plants will not be damaged by trampling while the other or others are irrigated and held for later use. Where a three-pasture system is used and there is more grass early in the season than the stock can use, one pasture may be harvested for hay or silage and grazed later in the season in rotation with the other two pastures. By having four pastures, the period of grazing can be shortened and the period of rest lengthened, which is often desirable as the rate of plant growth during the summer is slower than in the spring.

Mowing has increased the grazing capacity of pastures from 25 to 100 percent on more than 100,000 acres of pasture on over 200 farms and ranches in the eastern part of Texas, as shown by recent reports of the county agents of 20 counties, extending from the Red River on the north to the Neuces on the south.[2] According to some of these reports, mowing also reduces injuries to livestock by flies, mosquitoes, and ear ticks. The rolling cutter, an implement similar to a stalk cutter, is considered more effective than a mower by many ranchmen because it operates with less breakage and less expense than a mower and can be used on rougher ground. The rolling cutter also gives the soil some cultivation. In various parts of the country, the Agricultural Adjustment Agency provides a payment in 1943 for mowing pastures, under certain conditions, which varies from 25 cents to 75 cents per acre.

Where mowing or clipping is done there is no occasion for burning. In fact, burning is condemned as a pasture practice because it injures many desirable grass plants, destroys mulch, leaves the ground bare and exposed to erosion, and reduces the feed supply. On rough ground, which cannot be mowed, occasional burning may, sometimes, be justified to reduce brush and to make the new spring growth of grass available to cattle. In some areas, especially on poor and acid soils, coarse grasses become so woody and unpalatable when they are mature that they seriously interfere with grazing the new growth the following spring. Where it is not possible to graze such grass off during the growing season and it cannot be mowed, burning may be practiced to get satisfactory use of the new grass while it is young and tender. Such burning should occur as infrequently as possible and only when the ground is wet and there is no danger from wind. On land that erodes, burning should be delayed as much as possible in the

[2] This information was furnished by Robert R. Lancaster, extension pasture specialist, Texas Agricultural Extension Service, College Station, Tex.

winter or spring, so that new growth will soon cover the ground. In the 1943 AAA program, payments of as much as 5 cents per 100 feet are provided for the establishment of fireguards to protect pastures from fire.

LIMING AND FERTILIZING PASTURES

Pasture plants, like crop plants, require the application of fertilizers when deficiencies exist in the soil. Such deficiencies may be the result of a natural lack of fertility, of erosion caused by excessive cultivation, of overgrazing, or of long-continued removal of fertilizing elements in the forage consumed by livestock, with inadequate provision for the restoration of such elements to the soil. The productivity of upland pasture in western Washington was increased 15 percent by applying liquid manure from the barn to the field. The problem is to recognize such deficiencies and to know what to apply and how much. The most common deficiencies in pasture soils can be corrected by applying lime and phosphate. On some soils, potash is also needed. It is usually best to apply enough at one time to meet the pasture needs for about 3 to 5 years. The applications most commonly recommended are 1 to 2 tons of ground limestone, 300 to 600 pounds of superphosphate (20 percent) and 100 to 200 pounds of muriate of potash, or the equivalent in mixed fertilizer. To be readily effective in correcting soil acidity, the limestone should be ground so fine that 75 to 90 percent will go through a 60-mesh sieve and all will go through a 10-mesh sieve. In all States in 1943 the Agricultural Adjustment Agency provides payments which cover a large part of the cost of applying lime, phosphate, and potash where they are needed on pasture land. This applies to both established and new pastures.

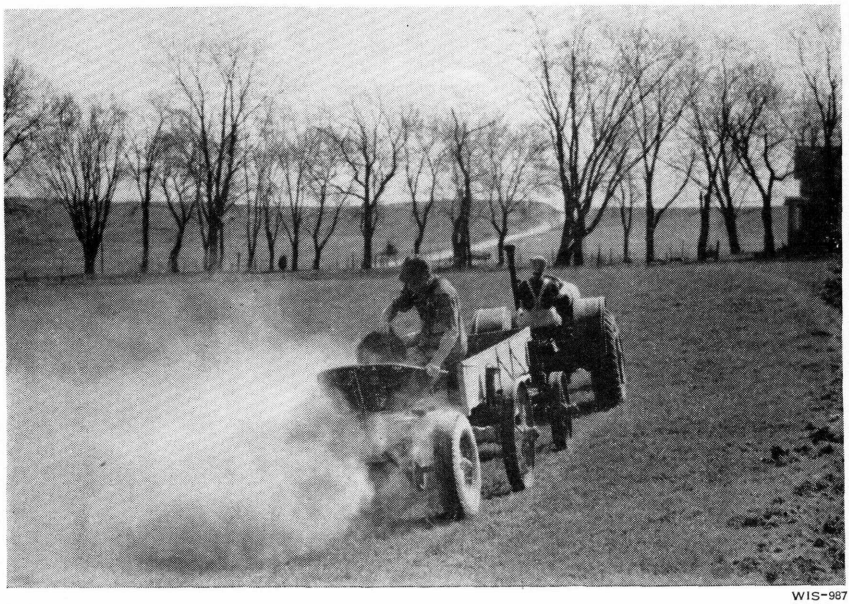
PASTURE RENOVATION

Much of the poor pasture on land not suitable for cultivation in the eastern half of the United States is covered with a thin sod of poor grasses, such as broomsedge and poverty grass (poverty oatgrass), with remnants of good grasses, such as bluegrass or Bermuda grass, and almost no legumes. The grasses make little growth. Most of them are unpalatable and have low feeding value. Most of their growth is made in the spring. In midsummer such pastures are nearly worthless for producing milk or fattening growing animals, and they are not worth much at any time (fig. 5).

Such pastures may be restored to a much greater productivity without cultivation by top dressing with lime and fertilizer, thereby giving legumes and the better grasses a chance to replace the poor grasses and weeds. This process may take several years and under certain conditions may not be effective or profitable.

By thorough disking, spring-tooth harrowing, or otherwise tearing up the old sod, mixing lime and fertilizer with the top 2 or 3 inches of soil, and seeding legumes, such pastures can be restored profitably in one growing season. Alfalfa, sweetclover, and red clover are recommended for this purpose in the North. They are deep-rooted, are fairly drought-resistant, and produce a heavy growth of forage for midsummer use, when there is a shortage of green feed on most farms. To supply still more feed, the taller and more productive grasses, such

as timothy, smooth bromegrass, and orchard grass, are also seeded where such grasses are lacking in the pasture to be renovated (figs. 14–18).



WIS-987

FIGURE 14.—This Wisconsin farmer and his wife applied phosphate to their pasture late in April as a step in renovation.

WIS-1000

FIGURE 15.—Tearing up the old sod with a spring-tooth harrow for pasture renovation.

WIS-981

FIGURE 16.—Spring seeding of legumes for pasture.

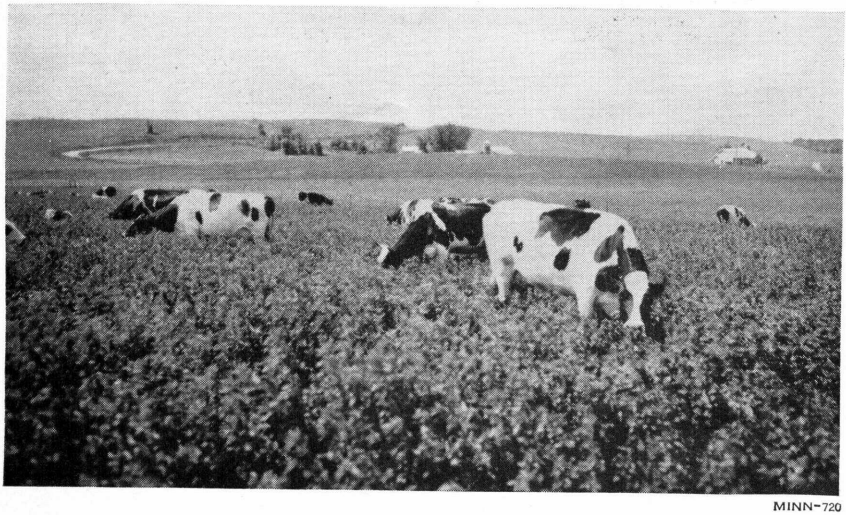


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FIGURE 17.—A typical luxuriant growth of sweetclover on a renovated pasture in southern Minnesota in early summer.

In the South, legumes such as white Dutch clover, crimson clover, and hop clover for winter and early spring grazing, and annual lespedeza for summer grazing, are recommended for renovating poor grass pastures. Dallis grass is recommended also for seeding in the renovation of Bermuda grass sods because it grows much earlier in the spring and stays green later than Bermuda in the fall.

In such renovation, the pasture being treated should be protected from grazing until the legumes are well established. Then, of course, grazing should be controlled so that the legumes have a chance to keep on making a good growth to maintain a productive stand and to produce plenty of seed, where reseeding is desirable.

WIS-683

FIGURE 18.—A rotation pasture of second-year sweetclover in southwestern Wisconsin which was still furnishing good grazing late in July. As the sweetclover was quite mature it would soon be necessary to move the cows to other pastures, such as Sudan grass or first-year sweetclover.

Payments made by the Agricultural Adjustment Agency in 1943 for reseeding depleted pasture vary in accordance with amounts of lime, fertilizer, and seeds to be used. In all cases, payments cover a large part of the cost. Allowances for the seed range from 10 cents to 50 cents per pound, depending upon the kinds of seed and their cost per pound. In some regions, there is an additional payment ranging from 25 cents to $1 per acre to cover a part of the other costs, such as spreading lime and fertilizer, disking, and seeding.

METHODS OF ESTABLISHING GOOD PASTURES

The variations in soil conditions, climate, adapted plants, farm implements, and the many problems of individual farms make it impossible to describe methods which will apply to every farm. In fact, the fertilizer and lime requirements and the seed to be planted may vary greatly in two or more parts of one small field. A brief discussion follows to show the order of procedure, the amount of work, and the expense involved in establishing good pasture. The usual costs for materials, alone, for pasture establishment range from $10 to $25 per acre; labor costs vary also, depending upon the amount of clearing and the condition of the soil. Establishing pastures on fer-

tile cropland, on which good crop rotations are being used, is chiefly a matter of selecting the right grass and legumes to replace or supplement the one legume commonly used in the rotation for soil improvement and making hay. Specific information on the treatment of a particular piece of land may be obtained from the local county agricultural agent or farm adviser or from the State agricultural college or experiment station.

TESTING THE SOIL

Success depends upon determining whether or not the soil needs lime, phosphate, potash, nitrogen, and humus for good pasture plants to thrive and what must be done to obtain as much of each as is necessary for an abundant growth of forage.

To do this, one must be careful to make certain that the soil taken from the field for analysis is a fair sample. Various methods of taking such samples are used by the State experiment stations. The following method is recommended by the South Carolina Extension Service:

Select three average places in each field or area of 20 acres or less. In each location mark off roughly a circle about 100 feet in diameter. Within each circle, use a sharp paddle, spade, or large spoon to take about one-half pint of soil from the upper 3 inches in each of 15 places. Mix the 15 samples thoroughly in a clean dry bucket or box. Do not pick up or mix soil with the hands. Fill a perfectly clean half-pint carton or glass jar with the mixed samples of soil from each of the three locations and get one similar sample from the subsoil at a depth of 7 to 20 inches. If your county agent or your State agricultural college does not test such samples, they can advise where to have the tests made.

CLEARING THE LAND

Brush, stumps, rocks, and other obstacles should be removed. Brush, trees, and stumps should be cut off at the ground level or below (fig. 19). The labor of clearing may be reduced considerably by burning, if there is much heavy brush and there is enough dead and dry material to carry a good fire. On sloping land, burning should be done just before the time of seeding in order to reduce erosion losses to the minimum. Grubbing out the roots increases the cost but reduces trouble with sprouts. Enough trees should be left for shade, preferably on the highest places in the pasture, so that soil and manure washed from the ground under the trees will be caught by the grasses on lower land. To protect the livestock during storms, it is well to ground such trees for lightining.

In most cases, the small brush, weeds, and other plant material which has been cut down is needed on the surface to provide a mulch to increase the amount of water soaking into the ground, to protect the soil from being packed by the rain, and to reduce soil losses by washing. Protection from washing is especially important on sloping land. Consequently, burning should be avoided wherever possible. By using a sharp and heavy disk, a mulch can usually be kept on the surface and a good seedbed prepared at the same time (fig. 20). In dry

areas, mulch reduces evaporation; in windy locations it protects the seedlings from wind action and drifting soil.

SC–D1–137

FIGURE 19.—Clearing alders in an old bottom-land pasture in the Upper Savannah Soil Conservation District of South Carolina. The farm conservation plan provided for planting 2 acres with sprigs of Bermuda grass and seeding 4 acres to Dallis grass and lespedeza in the spring, after the land had been cleared and fertilized.

C–8549

FIGURE 20.—A bush and bog disk used in Bristol County, Mass., to convert 20 acres of brushland into a highly productive Ladino clover pasture.

Large gullies may require fencing so that they can be protected from livestock and reclaimed by vegetation. Small gullies should be filled in and the surface mulched with hay or straw.[3]

Payments in 1943 by the Agricultural Adjustment Agency for clearing land of brush, trees, stones, and hummocks range in most regions from $3 to $5 per acre, provided the land is seeded or sodded to pasture grasses and legumes. An additional payment is made for establishing the pasture plants. For the cut-over forest areas of the North Central Region, provision has been made for a payment of $5 per acre for the improvement of open pasture land, which is not suitable for crops. This includes the uprooting and removal of brush, leveling of hummocks, removing loose stones, and mowing. In addition, there is a payment of $5 per acre for removing popple, cedar, scrub oak, and jack pine from pasture land.

APPLYING LIME AND FERTILIZERS

The application of lime should be made 6 months to 1 year in advance of seeding lime-loving legumes such as alfalfa and sweetclover. In the case of other legumes, it may be applied at the same time as the phosphate and other fertilizers. Phosphate should be applied just before the legumes are seeded, and in such a way that it becomes mixed with the surface soil to a depth of at least 2 or 3 inches. Barnyard manure should be worked into the soil as soon as it is spread on the ground, to avoid the loss of ammonia. In no case should it be left on the field in piles for even a day. Barnyard manure may also be used as a top dressing or mulch after seeding for protection to the young seedlings and for conserving soil moisture. It should be thinly and evenly distributed for this purpose. In all States, in 1943, the Agricultural Adjustment Agency provides payments which cover a large part of the cost of applying lime, phosphates, and in most States, potash, where they are needed on land being put into pasture.

PREPARING A FIRM SEEDBED

Thorough disking is recommended to prepare the soil for seeding pastures. If a disk is used, residues from the previous crop can more readily be kept on or near the surface to form a mulch and the surface soil is in better condition to absorb rainfall and is less likely to become hard when it dries. Thus, conditions are more favorable for seedlings to establish an unbroken contact with moist subsurface soil. In plowing there is danger that the soil may be left too loose and become dry to whatever depth it is plowed. Furthermore, if crop residues are plowed under they may interfere with the roots of the seedlings in their efforts to reach the firm and moist subsurface soil. However, plowing may be desirable where the ground is very weedy. In such cases it is often desirable to produce a crop such as corn or cotton that can be kept free of weeds by cultivation during the season previous to seeding the pasture grasses. If this is done, a seedbed of good tilth can be readily prepared by disking. After the surface soil has been prepared by disking alone or by plowing and disking or harrowing, it should be packed down so that the seed can be placed in firm

[3] For detailed information see Farmers' Bulletin 1813, Prevention and Control of Gullies.

In the South, for example, the South Carolina Extension Service recommends the following practices:

Upland. In the spring, before March 15, sow 20 pounds of common lespedeza, 5 to 10 pounds of Dallis grass, and sprig with Bermuda grass. In the fall, before November 1, sow 3 to 5 pounds of white Dutch clover on sod. In coastal section add 3 pounds of hop clover.

Bottom land and coastal lowlands. In the spring, before March 15, sow 20 pounds of common lespedeza and 10 to 15 pounds of Dallis grass. In the fall, before November 1, sow 3 to 6 pounds of white Dutch clover on sod. Add 3 pounds of hop clover in the coastal section.

For the seeding or sodding of new pastures, the Agricultural Adjustment Agency makes payments to cover a large part of the cost of seed or sod. These payments range from $3 to $7 per acre, in 1943.

WEEDS AND SPROUTS SHOULD BE MOWED

If weeds and sprouts threaten to get ahead of the seedling pasture plants, clip them to a height of about 3 or 4 inches. Cutting closer may damage the grass and legumes. In various parts of the country the Agricultural Adjustment Agency provides a payment in 1943 for controlling weeds in pastures. This payment ranges from 25 cents to 75 cents per acre.

SEEDLINGS REQUIRE PROTECTION FROM GRAZING

In every case, grazing should be deferred until the seedling grasses and legumes are well established, which usually takes 3 or 4 months. During the remainder of the season moderate stocking will not injure the plants. Of course, it is important to keep stock off when the ground is so wet that their feet cut through the grass into the soil. Under such conditions, the plants are injured and the soil may be hard and rough when it dries out.

SALT, FENCING, AND WATER COMPLETE THE PICTURE

Salt, good fences, and a plentiful supply of clean water that will last throughout the most severe droughts are necessary to make a pasture completely efficient.[4] The 1943 AAA program provides payments for the building of dams and reservoirs and the digging of wells. The rates of payment range from 7½ cents to 15 cents per cubic yard of dirt moved and from $1 to $2 per lineal foot of depth of wells.

Electric fences can be used effectively to control grazing and to reduce the costs of fencing.[5]

[4] For detailed information on supplying water to livestock on pasture see Farmers' Bulletin 1859, Stock-Water Developments: Wells, Springs, and Ponds.

[5] For additional information on fencing see Farmers' Bulletin 1832, Farm Fences.

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and moist soil that is not likely to dry out before the small and tender grass seedlings become well rooted. This packing of the soil can be done best by using a cultipacker, which is heavy enough to press the soil together to a depth of 3 or 4 inches and at the same time leave a part of the soil on the surface relatively loose. A sectional corrugated or ring roller does this very well (fig. 21).

FB-20401

FIGURE 21.—A cultipacker or some similar implement to make a firm seedbed is necessary to insure a good stand of pasture grasses and legumes. (Courtesy of Bureau of Plant Industry, Soils, and Agricultural Engineering.)

SEEDING: WHAT, WHEN, AND HOW

First of all, good seed adapted to the locality and recommended by the county agricultural agent or the State college of agriculture should be used. In some cases improved strains are available. Be sure that legume seeds are properly inoculated.

Most grass seed should be planted just deep enough to get well covered in firm soil, not over ½ to 1 inch. A disk drill is preferred (fig. 16), but a wheelbarrow or cyclone seeder may be used and the seed covered by light harrowing.

In the North it is common to recommend from 5 to 8 pounds of grass seed per acre, including one or two high-yielding grasses, such as timothy, orchard grass, or smooth bromegrass, and 8 to 15 pounds of legume seed per acre, including one or two productive species, such as alfalfa, red clover, or sweetclover, but not over 1 or 2 pounds of Ladino clover. It is usually best to seed the grasses early in the fall, and the legumes as early as possible in the spring—preferably before sowing oats. It is customary on good cropland to make pasture seedings with small grain (fig. 6). Early seeding gives legumes a chance to keep up with or get ahead of the weeds.